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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/107,684	06/30/1998	STEVEN M. BLUMENAU	E0295/7040-R	8390

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EXAMINER

ENCARNACION, YAMIR

ART UNIT	PAPER NUMBER
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2187

DATE MAILED: 09/16/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/107,684

Applicant(s)

BLUMENAU ET AL.

Examiner

Yamir Encarnacion

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 June 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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**DETAILED ACTION**

***35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

***35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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***Claim Rejections***

3. Claims 1-3, 10, 12-14, 22 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over *Rao* (USPN: 5,920,733).

<b>Claimed</b>	<b><i>Rao</i></b>
1. A storage system for use in a computer system including a host computer, the storage system comprising:	See figure 4, the host 250.
at least one storage device having a plurality of user-accessible storage locations, the at least one storage device including at least one disk drive;	See figure 4, the disk 208.
a cache memory; and	See figure 4, the buffers 226 and 228.
a controller, coupled to the cache memory and the at least one storage device, that controls access to the at least one storage device from the host computer,	See figure 4, the SCSI controller board 202 and the drive controller board 206.

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the controller being capable of generating data that is independent of any data passed from the host computer to the storage system and writing the generated data to a first <u>user-accessible</u> storage location of the plurality of <u>user-accessible</u> storage locations on the at least one storage device in response to a communication from the host computer that does not include the generated data to be written to the first <u>user-accessible</u> storage location.	The formatting process described on figure 6 meets the limitation of the claim. Also, see column 9, lines 35-41.
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As to claims 2 and 13, the format command meets the limitation of the claim.

As to claims 3 and 14, the format command involves writing data having a predetermined state.

As to claim 10, see figure 4, the processing circuitry 230.

As to claims 12 and 22, see the comments for claim 1 above.

4. Claims 4-9, 11, 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Rao* as applied to claims 1, 2, 12, 13 and above, and further in view of *Shank* (USPN: 6,145,028).

As to claims 5 and 16, *Rao* does not explicitly disclose that the host computer perceives the storage location to be on different storage devices of the at least one storage device. *Shank*

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discloses of a system that implements virtual disks by using more than one physical disk. See *Shank*, column 3, lines 37-39. A person of ordinary skill in the art would have been motivated to implement virtual disks such as the ones described by *Shank* in *Rao* for the purpose of creating logical disks that are larger than any single physical disk in the system as suggested by *Shank* in column 3, lines 54-56. Accordingly, it would have been obvious to modify *Rao* so as to implement virtual disks of the type described by *Shank* because the *Rao/Shank* combination would have enabled the creation of logical disks that were larger than any single physical disk in the system.

The *Rao/Shank* combination would have met the limitation that a plurality of user accessible location were perceived by the host computer to be storage locations on different devices because (a) the virtual disks are stored across different physical disks (See *Shank*, figure 3) and (b) mapping (such as the one described by *Shank* in step 508 of figure 5) is what enables the host to access the correct physical location in response to a virtual disk request.

As to claims 4 and 15, see the alternative suggested by *Shank* on figure 2. In the alternative, see the comment for claim 5 above. Note that in the interpretation regarding the comments made with respect to claim 5, the “non-contiguous storage locations on the at least one storage device” are the plurality of physical disks on the one logical volume.

As to claims 6 and 17, see the comments for claims 4 and 5 above.

At to claims 7 and 18, in the format command, the range of area to be formatted would have necessarily been identified. In the alternative, the examiner takes “Official notice” that files are

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often written in a fragmented fashion because there is no single continuous "chunk" of disk space large enough available to hold the file. When files are written to virtual disks of the type described by *Shank* which can be spread among many physical disks or be made up of non-contiguous portions of a single disk, writing to such virtual disks would have necessarily involved mapping files among the separate non-contiguous areas.

As to claims 8 and 19, see the comments for claims 4 and 5 above.

As to claims 9 and 20, see the comments for claim 4, 5, and 3 above.

As to claims 11 and 21, see the comments for claim 5 above.

5. Claims 7 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Rao/Shank* as applied to claim 4 and 15 above, and further in view of *Jeffries* (USPN: 5,974,544). The *Rao/Shank* combination does not explicitly describe a single command separately identifying two storage locations.

*Jeffries* describes "Scatter/Gather" operations on column 6, lines 26-43:

Scatter/Scatter Read/Write Requests

"Scatter" and "gather" refer generally to common techniques in computer architecture: "scatter" is the transfer of a block of information from a contiguous set of locations to a discontinuous set of locations. Gather is the opposite process, ie. collecting information from a discontinuous set of locations for transfer to a contiguous set of locations.

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Scatter and gather operations often arise in connection with a transfer of data across a boundary, e.g. from main memory to a peripheral. DMA controllers have included the capability for gather operations, to transfer a block of data from scattered locations of main memory out over the bus, or vice versa.

It is also suspected, although not known with certainty, that a Conner IDE drive currently in development allows a single I/O request to access discontinuous regions of the disk.

The above passage at the very least suggests of using a single I/O request to access discontinuous regions on disks. A person of ordinary skill in the art would have found it obvious to implement "scatter/gather" operation like the one's described by *Jeffries* because in doing so the number of commands required to access discontinuous data would have been reduced and improved performance. Accordingly, it would have been obvious to implement "scatter/gather" capabilities of the type described in *Jeffries* into the *Rao/Shank* combination because the *Rao/Shank/Jeffries* combination would have reduced the number of commands required for accessing discontinuous information and would have achieved improved performance.



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*Response to Arguments*

6. Applicant's arguments filed August 20, 2002 have been fully considered but they are not persuasive.

7. On page 2 of the papers filed, applicant argues that 'both low-level and high-level formatting of a disk results in changes to storage locations on a disk that are not "user-accessible."' The examiner does not agree. The documents that applicant relies for his assertion contravene applicant's own position. For example, as to low level formatting, <http://www.pcguide.com/ref/hdd/geom/formatLow-c.html> states:

"If an LLF [Low Level Format] is done on a disk with data on it already, **the data is permanently erased** (save heroic data recovery measures which are sometimes possible)." (Emphasis added)

In addition the following background material regarding low level formatting rejects applicant's position:

*Saucier* (Saucier, J., Re: Formatting Disks. [Online] [news://alt.windows95](http://alt.windows95), September 4, 1999) states:

"[Low Level formatting] is the only true way to remove data from a disk."

*Landis* (Landis, H. What does a low level format do? [Online] [news://comp.sys.ibm.pc.hardware.storage](http://comp.sys.ibm.pc.hardware.storage), September 14, 1994) states:

"The original ATA specification (now at rev 4.0c, also known as ATA-1) documents the "full" function Format Track command but leaves it to the drive vendor to decide what a drive

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will really do. It recommends a minimum action of writing binary zero into the data field of each sector formatted ...

Assuming that you can find a program that really does issue the ATA Format Track command your ATA drive probably doesn't do anything other than write some data pattern, maybe binary zeroes, into the data field of every sector on the drive. That is no different than just using the normal write command and writing data into every sector on the drive."

In addition, applicant's argument regarding high-level formatting is unconvincing. For example, applicant's own document from

<http://www.pcguide.com/ref/hdd/geom/formatHigh-c.html> states:

"High-level formatting is the process of writing the file system structures on the disk that let the disk be used for storing programs and data."

It should be beyond dispute that the file system structures are "user accessible storage locations." After all, how can a user access the data stored on a disk if not by using the information stored in the file system structures? As explained in *Saucier*, "[High level formatting] destroys the file allocation table, and the directory structure, but in fact does not destroy the files. Unfortunately[,]  
**without a FAT table and ROOT structure, there is simply no telling what is on the drive,** and therefore in effect the drive is clean." (Emphasis added)

As to the argument regarding *Rao*'s conversion algorithm which the examiner interpreted to read on the claimed "generating data that is independent of any data passed from the host computer to the storage system and writing the generated data to a first user-accessible storage

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location of the plurality of user-accessible storage locations on the at least one storage device in response to a communication from the host computer that does not include the generated data to be written to the first user-accessible storage location.” The examiner had made the interpretation in view of applicant’s argument on page 8 of the papers filed on December 3, 2001 that claims 1, 11, 12, 21, and 22 were “not limited to [a] secure delete operation [given that they could read on other operations], for example, . . . the transformation operation described at page 26 lines 25-30 of Applicants’ specification.” However, given applicant’s clarification on page 4 of the papers filed on August 20, 2002 explaining that claims 1, 11, 12, 21, and 22 cannot be read on the transformation described on page 26 lines 25-30 of applicant’s specification, the examiner is withdrawing the just pointed out interpretation of the reference onto the claims.

As to applicant’s argument on page 4 of the papers filed on August 20, 2002 that neither *Rao* or *Shank* “alone or in combination discloses, teaches, or suggests generating data that is independent of any data passed from a host computer to a storage system and writing that generated data to a user-accessible storage location,” the examiner disagrees. As the documents provided by applicant regarding low level formatting and high level formatting and the *Saucier* and *Landis* documents demonstrate, the formatting operations described by *Rao* either inherently involved the process of writing data to the disk in the user accessible storage areas (in the case of low level formatting) or inherently involved writing file system structures in the user accessible storage areas (in the case of high level formatting). The data written in both the high level

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formatting and the low level formatting was independent of any data passed from the host computer to the storage system.

As to applicant's request for an interview on page 4. While the examiner tries whenever possible to allow time for interviews, by the time the examiner picked up the present application, there was insufficient time to schedule one. Should applicant or his representative believe that an interview would advance prosecution, an interview could be scheduled at a later time.

***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this or an earlier communication from the Examiner should be directed to Yamir Encarnacion by phone at (703) 308-5466.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Do Yoo, can be reached on (703) 308-4908.

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Any formal response to this action intended for entry should be mailed to Box AF, Commissioner of Patents and Trademarks, Washington, D.C. 20231 or faxed to (703) 746-7238 and labeled "EXPEDITED PROCEDURE." Any informal or draft communication should be faxed to (703) 746-7240 and labeled "INFORMAL" or "UNOFFICIAL" or "DRAFT" or "PROPOSED" and followed by a phone call to the Examiner at the above number. Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

YEE

Yamir Encarnacion

Patent Examiner

September 6, 2002

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